

538,947

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
1 July 2004 (01.07.2004)

PCT

(10) International Publication Number
WO 2004/055718 A1

(51) International Patent Classification⁷: **G06K 9/62**

(21) International Application Number:
PCT/GB2003/005285

(22) International Filing Date: 4 December 2003 (04.12.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
0229473.4 18 December 2002 (18.12.2002) GB

(71) Applicant (for all designated States except US): **QINETIQ LIMITED** [GB/GB]; Registered Office, 85 Buckingham Gate, London SW1E 6PD (GB).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SPENCE, Geoffrey**

[GB/GB]; QinetiQ Limited, Malvern Technology Centre, E building Room 510, St Andrews Road, Malvern, Worcs. WR14 3PS (GB). **CLARKE, Ira, James** [GB/GB]; Little Clevelode Farm, Little Clevelode, Malvern, Worcs WR13 6PE (GB).

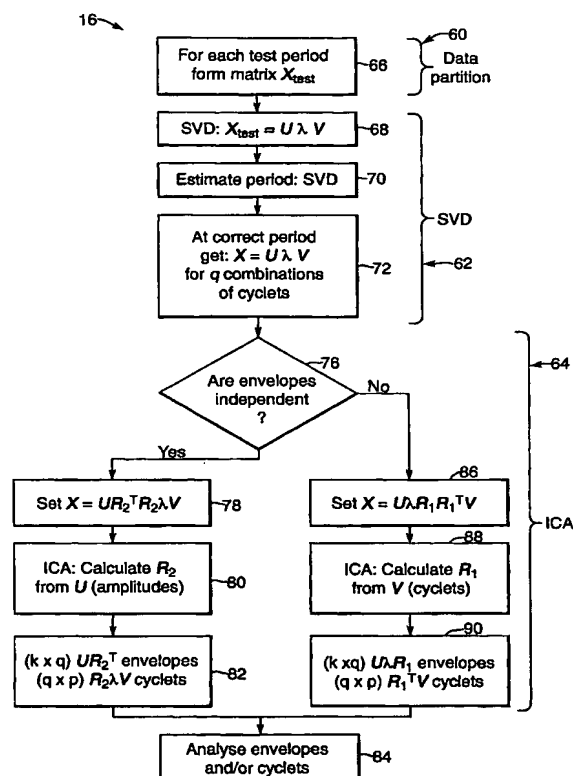
(74) Agent: **WILLIAMS, A., W., S.**; IP Qinetiq Fromalities, Cody Technology Park, A4 Building, Room G016, Ively Road, Farnborough, Hampshire GU14 0LX (GB).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),

[Continued on next page]

(54) Title: **SIGNAL SEPARATION**



(57) Abstract: A signal separation method (16) for separation of source signals from a composite signal (104) expresses the composite signal (104) as a series of values of signal amplitude. The source signals have periodicities similar or equal to p . The composite signal (104) is partitioned into sections which provide respective rows of a matrix X , in which successive rows represent successive sections. A singular value decomposition of the matrix X is performed to obtain two singular vector matrices U , V and a singular value matrix λ . An independent component analysis is performed on one of the singular vector matrices U , V to obtain an independent component matrix UR_2^T , $R_1^T V$ and an associated component matrix $R_2 \lambda V$, $U \lambda R_1$. One of the component matrices UR_2^T , $U \lambda R_1$ contains estimated separated signal modulation envelopes and the other component matrix $R_2 \lambda V$, $R_1^T V$ contains estimated separated cycles.

WO 2004/055718 A1